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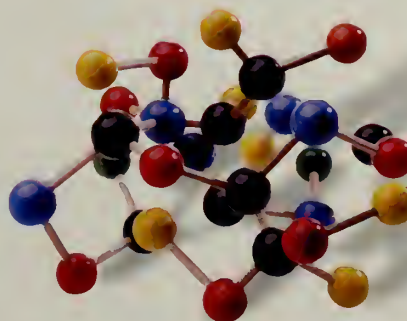
The future is now.

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Worcester Foundation for Biomedical Research

Supporting basic biomedical research at the University of Massachusetts Medical School



The Worcester Foundation for Biomedical Research is a 501(c)(3) nonprofit organization internationally recognized for its revolutionary contributions to biology and medicine. Among its best known contributions are the discovery and development of the birth control pill, the pioneering work that made *in vitro* fertilization possible and the first systematic laboratory study of the anti-tumor actions of tamoxifen, an anti-estrogen drug that has subsequently revolutionized treatment of breast cancer.

Initially an independent research institute, the Worcester Foundation for Biomedical Research merged with the University of Massachusetts Medical School in 1997. Today, the Worcester Foundation is devoted to the support of basic biomedical research of the combined research enterprise, and to the education and training of tomorrow's scientists.

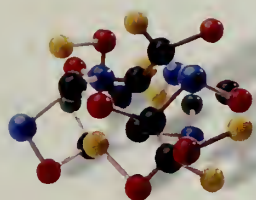


Table of Contents

| | |
|--------------------------------------------------------------------|-------|
| Message from the Chairman | 2 |
| Message from the President | 3 |
| Message from the Director | 4 |
| The Year in Review | 5-6 |
| Beyond Imagining the Possibilities: The Annual Research Fund | 7-8 |
| Ascending to New Heights: The Hudson Hoagland Society | 9 |
| Driving Research: The Worcester Foundation Auxiliary | 10 |
| Applauding Advocacy: Private Support for Research | 11 |
| Named Endowment Funds | 11-13 |
| Planned Gifts and Bequests | 13 |
| The Annual Research Fund | 14 |
| Hudson Hoagland Society Members | 14-15 |
| Additional Donors | 15-18 |
| Corporate and Foundation Donors | 18 |
| Memorial and Special Occasion Gifts | 18-21 |
| The Worcester Foundation Board of Trustees | 22-23 |
| Making a Gift | 24 |



Message from the Chairman

The Worcester Foundation for Biomedical Research has for decades been internationally recognized for its revolutionary contributions to biology and medicine. Among the earliest, and best known, was the discovery and development of the birth control pill, giving millions of families control over childbearing. Subsequent discoveries include pioneering work that led to the development of *in vitro* fertilization and the first systematic laboratory studies of the drug tamoxifen, used to prevent and treat breast cancer.

and intellectual property, and physical plant and equipment.

Several new trustees were elected this year, and will help us tremendously as we embark on this new, exciting role: Melvin S. Cutler, I. Robert Freeland, Maurice H. Martel, DDS, William C. Meyers, MD, and O. Nsadinanya Okike, MD. We also welcome back to the board a former trustee and board chairman, Robert M. Quinlan, MD. This distinguished group will bring much experience and wisdom to the board in its advisory position.

Poised on the threshold of a new millennium, the Worcester Foundation is entering a new and exciting chapter in its evolution.

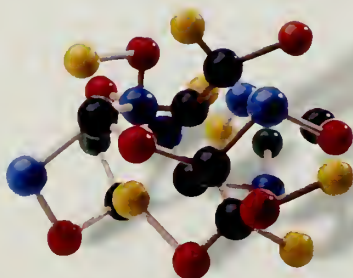
Just two years ago, the Foundation merged with the University of Massachusetts Medical School, and we could not have envisioned a more successful, productive union. Today, this integrated entity's faculty are leaders in areas such as gene expression, cell dynamics and cellular imaging, cell signaling, diabetes, pediatric and adult HIV/AIDS and immunology. Major new initiatives in human genetics and neuroscience are planned.

To further solidify the merger, last fall UMMS Chancellor and Dean Aaron Lazare asked the Worcester Foundation Board of Trustees to serve as the lay advisory council to the Medical School on matters relating to the research enterprise, which we eagerly agreed to do. In this expanded role, the board will provide advice and counsel on strategic planning, research affiliations, finance and philanthropy, commercial ventures

The Worcester Foundation continues to be the engine that drives this research enterprise forward by providing crucial philanthropic support. The past fiscal year saw us raise \$2.21 million in private support for research at UMMS. The commitment and generosity of every donor help propel us toward ultimate freedom from disease. To each of you, I wish to extend my heartfelt thanks and appreciation for your contributions over the past year. And I look forward to working closely with you to advance our research programs in the new millennium.

A handwritten signature in dark ink, reading "Morton H. Sigel".

Morton H. Sigel





Message from the President



It was a wonderful year in the life of the Worcester Foundation for Biomedical Research.

Thanks to the vision and generosity of several major benefactors—Mr. Robert W. Booth, the late H. Arthur Smith and the trustees of his foundation and Dr. Vitold Arnett—three endowed positions were created at the University of Massachusetts Medical School through the Worcester Foundation. These positions (and their faculty awardees) are: the George F. Booth Chair of Basic Sciences (George B. Witman III, PhD, professor of cell biology); the H. Arthur Smith Chair for Cancer Research (Richard B. Vallee, PhD, professor of cell biology); and the Vitold Arnett Professorship of Cell Biology (Thoru Pederson, PhD, professor of biochemistry & molecular biology).

A medical school's ability to offer endowed positions to its best and brightest research faculty is so very important, both to retain its stars and recruit the best talent. The number of endowed chairs and professorships at UMMS has grown from four to 16 between 1997 and 1999 alone, thanks in part to the benefactors of the Worcester Foundation. The Foundation also created six new postdoctoral fellowships, enabling young investigators to get their careers started and new ideas to flourish.

With major support from the Fannie E. Rippel Foundation and others, including the Aldus C. Higgins Foundation, the George F. and Sybil H. Fuller Foundation, the Thomas Anthony Pappas Charitable Foundation, the Elizabeth Taylor Fessenden Foundation, the J. Irving England and Jane L. England Charitable Trust and the Margaret Sherman Trust, the Worcester Foundation has helped establish a nuclear magnetic resonance imaging facility that will help transform research into new patient treatments. With this tool, we can study the structure and function of enzymes and proteins in order to develop more efficiently new drug therapies to fight diseases such as AIDS, sickle cell anemia, and breast and prostate cancer.

For two years now, the Worcester Foundation Board of Trustees has awarded grants of approximately \$33,000 each as seed money for the most promising new research projects at UMMS. Nineteen grants totaling over \$625,000 have been awarded so far. These monies are raised through the Annual Research Fund, including the Hudson Hoagland Society. This initiative has proved to be a valuable

catalyst in helping our investigators obtain further federal funding; in fact, those funded in the program's first year have garnered some \$3.5 million in National Institutes of Health (NIH) grants to date. Our goal is to grow the Annual Research Fund in order to award more seed grants in the future.

With more than \$93 million in total annual NIH funding for research, UMMS today is emerging as an institution of national distinction. The key to sustaining this momentum is through the growth of our research program. By adding talented faculty and strengthening our centers of research excellence, we can fuel remarkable discoveries that improve patient care and, ultimately, cure disease. I thank all of you who share this vision.

Edward Bresnick

Edward Bresnick, PhD

Message from the Director

Our successful, new partnership with the University of Massachusetts Medical School is now in full stride and success rings out in every hallway of our laboratories.



Our collective scientific enterprise now enjoys new efficiencies, with groups of collaborating researchers enjoying reduced operating costs. These new collegial relationships and their commerce of shared ideas are catalyzing increasingly vigorous new attacks on the fundamental principles of biology, as well as the major diseases that afflict us.

Now, as a matter of sheer scale, there are more scientists with more ideas, with all of us able to access more state-of-the-art facilities than ever before to accelerate the pace of our work. And yet, it goes both ways; indeed, the Worcester Foundation has offered much to UMMS. Our legacy of major scientific awards and programs, the commitment of our board of trustees and our international stature all add to the new collaborative spirit.

The renewed vigor of the Worcester Foundation's constituency, many of whose members were anxiously waiting to see if the merger would be successful, is enormously gratifying. This enthusiasm includes not only our trustees, but major foundation sources of support, our

Hudson Hoagland Society, individual donors and our wonderful Auxiliary, which has launched new fund-raising programs with great panache. I wish to convey my heartfelt thanks to all our supporters who have stayed the course during this transitional period and now support the Worcester Foundation in its new collaborative linkage with research at UMMS.

The Worcester Foundation and UMMS are now engaged in the construction of an exciting new research laboratory building that will enable us to recruit over 100 new research scientists in the next three years. This building will be designed to facilitate basic biological research in the Worcester Foundation tradition, coupled with more disease-relevant studies and clinical investigations. The 10-story building will house programs in human genetics, biochemistry and drug design, cancer research, neuroscience and a newly invigorated Department of Medicine with a research-intensive motif. The Worcester Foundation and its board of trustees are strategically involved in the plans for this new

building and in the campaign to complete its financing. I am excited by the promise of this building and its scientists. We are evolving to the next tier of excellence, where the stature and number of exuberant, interacting scientists will constitute a biomedical research spirit greater than the sum of its parts.

I don't usually plan too far ahead on my calendar, but I know where I'll be on an early fall day in 2001: at the dedication of the new research laboratory building. Louis Pasteur was stimulated to speak his uplifting words by the opening of a new laboratory building he was dedicating. May our new building equally stir our passions, leading us to see all we can see as scientists, and to be all we can be as healers, as the light of a new age of medicine dawns on our campus.

A stylized, handwritten signature of Thoru Pederson in dark ink.

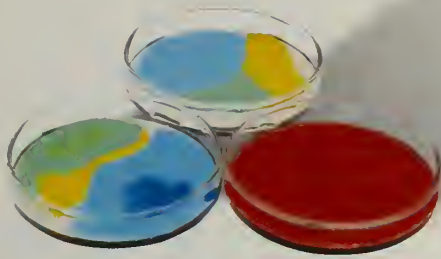
Thoru Pederson, PhD
The Vitold Arnett Professor
of Cell Biology

"Take interest, I beseech you, in those sacred institutions which we designate under the expressive name of laboratories. Demand that they be multiplied and adorned; they are the temples of wealth and of the future. There it is that humanity grows, becomes stronger and better. There it learns to read in the works of nature, symbols of progress and of universal harmony, whereas the works of mankind are too often those of fanaticism and destruction..."

—Louis Pasteur, Paris, 1888



The Year in Review



Faculty invested

At a ceremony at the Hoagland-Pincus Conference Center on the Worcester Foundation campus, faculty members were appointed to endowed professorships, and the donors of the endowments were honored. Worcester Foundation researchers invested were George B. Witman III, PhD, the George F. Booth Chair of Basic Sciences; Richard B. Vallee, PhD, the H. Arthur Smith Chair for Cancer Research; and Thoru Pederson, PhD, the Vitold Arnett Professor of Cell Biology. Presenting the medals were Penelope B. Rockwell, trustee of the Worcester Foundation and niece of donor Robert W. Booth, and Attorney Matthew Erskine, chairman of the H. Arthur Smith Charitable Foundation.



George B. Witman III, PhD, and Penelope B. Rockwell



Richard B. Vallee, PhD, and Matthew Erskine, Esq.

M. C. Chang Distinguished Lecture

Shirley M. Tilghman, PhD, one of the world's outstanding researchers in the areas of mammalian development and genomic imprinting, gave the M. C. Chang Distinguished Lecture in January. Dr. Tilghman is the Howard A. Prior Professor of Life Sciences in the Department of Molecular Biology at Princeton University.



Shirley M. Tilghman, PhD

'Key discovery' in cancer research

The journal *Science* lauded the work of Greenfield Sluder, PhD, professor of cell biology, and his laboratory team in identifying a trigger that helps tell a dividing cell to copy its centrosome. The journal published his landmark article on the discovery, which may help researchers understand how abnormal replication occurs and its implications for cancer.



Renovations: before and after

Foundation renovations

Laboratories dating from the early 1960s in Wing B of the Chang Building complex on the Worcester Foundation campus were renovated into 24,000 square feet of modern office space during the spring. New tenants include the Center for Health Care Financing. In the fall, work was completed on the Reed-Rose and Gordon Research Laboratory, where active research programs will soon be underway.

Pederson receives international prize

In Prague in the summer, Thoru Pederson, PhD, the Vitold Arnett Professor of Cell Biology and director of the Worcester Foundation, was awarded the Bernhard Medal. The honor recognizes outstanding scientific contributions to the study of the cell nucleus and was bestowed during the 16th International Workshop on the Cell Nucleus at a symposium of which Dr. Pederson was the keynote speaker.

New director of Office for Research

John L. Sullivan, MD, professor of pediatrics, pathology, and molecular genetics & microbiology, was named director of the Office for Research. In addition to heading the Office, which assists more than 250 researchers, Dr. Sullivan works with the chancellor and his staff on all research matters. Priorities include the development of a clinical trials office, establishment of a scientific research council and renovation of research facilities in the basic and clinical science wings on campus.



John L. Sullivan, MD



Michael R. Green, MD, PhD

Program in Gene Function and Expression

UMMS formed the Program in Gene Function and Expression to study the molecular and genetic bases of human diseases and the mechanisms that regulate how genes are expressed. Program Director Michael R. Green, MD, PhD, professor of biochemistry & molecular biology and Howard Hughes Medical Investigator, has begun recruiting investigators for the Program, which will be housed in the new research laboratory building.



Robert W. Finberg, MD

Chair of Medicine appointed

Robert W. Finberg, MD, was named professor and chair of the Department of Medicine at UMMS. Formerly professor of medicine at Harvard Medical School and chief of the Infectious Disease Program in the Department of Adult Oncology at the Dana-Farber Cancer Institute, Dr. Finberg pursues research that links the mechanisms of infectious disease with the causes of and cures for cancer. He is presently principal or co-principal investigator for six research studies.



V. Craig Jordan, PhD, DSc

Trustee Jordan honored as Diana, Princess of Wales Professor

British native V. Craig Jordan, PhD, DSc, a trustee of the Worcester Foundation and professor of cancer pharmacology at Northwestern University, was named the Diana, Princess of Wales Professor of Cancer Research at Northwestern. Presented in accordance with the wishes of Diana's family, the chair is the only one of its kind to be bestowed. As a visiting research fellow at the Foundation from 1972 to 1974, Dr. Jordan completed early studies on the anti-estrogen effects of the chemical tamoxifen, a drug that has been hailed as one of the most significant therapies in the last 20 years for treating estrogen-dependent breast cancer.



Edward Ginns, MD, PhD

Ginns named director of the Brudnick Institute

Edward Ginns, MD, PhD, was appointed executive director of the Irving S. and Betty Brudnick Neuropsychiatric Research Institute, a facility dedicated to researching the causes, treatment and prevention of mental disorders, and to training basic and clinical

researchers. Dr. Ginns, an internationally renowned neuroscientist and geneticist, comes to Worcester from a position as chief of the Clinical Neuroscience Branch at the National Institute of Mental Health in Bethesda, Maryland.



Ceremonial groundbreaking December 13

Construction gets underway

UMMS officially broke ground for the construction of the new research laboratory building, scheduled for a fall 2001 opening. Chancellor and Dean Aaron Lazare was joined by University President William M. Bulger and over 100 friends and city, state and University officials. Nancy and Robert Feldman of West Newton and John and Linda Nelson of Worcester were introduced at the ceremony as co-chairs of the capital campaign to raise an estimated \$33 million in private donations needed to support the building's construction.



Architectural rendering of the new research laboratory building



Beyond Imagining the Possibilities: **The Annual Research Fund**

The trustees of the Worcester Foundation this year awarded grants totaling \$327,722 for promising, innovative research projects at the University of Massachusetts Medical School.

Ten research projects were funded from a field of 68 candidates with monies raised through the Annual Research Fund. The projects are in areas related to, among others, repair of tissue injury; the identification of new targets for antibiotics; spinal cord injuries and multiple sclerosis; new treatments and preventions for infectious diseases; gene therapy; cancer prevention; and HIV/AIDS.

This is the second year in which the Worcester Foundation has allocated unrestricted funds to provide seed support for promising new investigations. The generosity of the many donors who contribute to the Annual Research Fund, including the members of the Hudson Hoagland Society, enable the Worcester Foundation to increase its support of start-up research, providing invaluable assistance where federal monies are often unavailable.

Contributions to the Annual Research Fund go directly into research laboratories. The scientists whose research proposals received grants in this year's round of funding are:

Paul Bankey, MD
Surgery

MAP kinase regulation of neutrophil apoptosis during inflammation

Neal C. Brown, PhD
Pharmacology & Molecular Toxicology
Cloning and characterization of a heat-stable DNA polymerase III

Joaquin Cortiella, MD
Anesthesiology and Pediatrics
Tracheal reconstruction using tissue engineered epithelium in an inhalation injury model

Daniel L. Kilpatrick, PhD
Physiology
E2F4 and the differentiated state

Stephen Lambert, PhD
Cell Biology

Establishment of a co-culture system for the study of Schwann cell/CNS interactions

John Leong, MD, PhD
Molecular Genetics & Microbiology
Synthetic peptides that block colonization by enterohemorrhagic *Escherichia coli*

Shan Lu, MD, PhD
Medicine
Polyvalent HIV DNA vaccines

William C. Okulicz, PhD
Obstetrics & Gynecology
Laser capture microdissection and differential cell-type response

Madelyn R. Schmidt, PhD
Molecular Genetics & Microbiology
A new model of mammalian gene transfer

Michael R. Volkert, PhD
Molecular Genetics & Microbiology
Does mutation of the acute myeloid leukemia factor MLF1 cause increased sensitivity to oxidative DNA damage?

The Annual Research Fund

A Step Toward New Therapies

When a disease such as multiple sclerosis (MS) or a spinal cord injury destroys myelin, the insulating material wrapped around the nerve fibers of the brain and spinal cord, signals transmitted through the central nervous system (CNS) are slowed, garbled or blocked.

Transplanting Schwann cells—the cells that lay down the myelin sheath around nerve fibers—from a patient's peripheral nervous system into the CNS has been proposed as a therapy for MS and spinal cord injuries. Stephen Lambert, PhD, UMMS professor of cell biology, is applying a Worcester Foundation Annual Research Fund grant to work in this area.

"Although transplantation studies in animals have shown promise for this therapy, an *in vitro* system to study and

manipulate the interaction of Schwann cells and central nervous system axons [nerve fibers] hasn't been established," Dr. Lambert explained. In his lab, Lambert is establishing a co-culture system that can be used to determine whether Schwann cells are able to myelinate CNS nerve fibers *in vitro*. Next, he'll use this co-culture system to learn if Schwann cells can distinguish between myelinated and non-myelinated CNS axons and, ultimately, whether they can correctly stimulate the formation of nodes that help to transmit electrical signals through the CNS, and recover function.

"This work is crucial to assessing the suitability of future transplantation therapies involving Schwann cells, and for developing drugs and techniques

that may enhance these therapies," Lambert said. "The pilot nature of this project, however, doesn't lend itself to funding from the usual sources. But the Worcester Foundation grant allows me to develop this important work independently and, it's hoped, to an extent where it could merit NIH funding."



Stephen Lambert, PhD

A Path to Correcting Genetic Defects



Madelyn R. Schmidt, PhD

Rapid advances in molecular biology have made the repair of genetic defects by transferring normal genes into mutant cells a clinical reality. This procedure, known as gene therapy, is applicable to any type of cell. Lymphocytes, or white blood cells, frequently have genetic defects that cause immunodeficiencies, such as those in children who must live in isolation chambers (the "bubble boy") and who have AIDS-like pathology.

One focus of research in the UMMS lab of Madelyn R. Schmidt, PhD, is the development of gene transfer techniques that can be used to correct these types of genetic defects. Gene therapy, however, must first be modeled in animals, usually mice, and shown to be safe and effective before human trials can begin.

"Grant support from the Worcester Foundation has enabled our laboratory to characterize a new mouse model, called a 'transgenic,' that is a powerful tool in the study of gene transfer and function in normal cells," explained Dr. Schmidt, professor of molecular genetics & microbiology.

Transgenic mice are born from fertilized eggs injected with DNA that the resulting mouse usually absorbs. This expansion of genes allows scientists to put the "knockout" procedure to work; the developing mice are injected with additional cells that have been manipulated in culture so that existing functions are "knocked out." This

enables researchers to identify specific gene functions and analyze how the knocked-out gene's inactivation affects the entire organism.

"We're really excited about what we can do with this new mouse model. No other available transgenics offer the same opportunities for gene therapy and analysis," Schmidt continued. "We've been able to demonstrate that we can transfer the expressive genes in lymphocytes taken directly from our transgenic animals, which gives us a unique opportunity to study gene function and ultimately correct genetic defects."

Two papers on the project are currently being prepared for publication, according to Schmidt.



Lou Landoli, Peter Hillary, Marty Martel and Mort Sigel

Ascending to New Heights: The Hudson Hoagland Society



Warner Fletcher and Peter Hillary

The Society has raised over \$2.5 million since its inception in 1985, support that provides needed resources for scientists from the combined Worcester Foundation/UMMS enterprise to pursue new avenues of inquiry.

Named to honor the memory of the co-founder of the Worcester Foundation for Biomedical Research, the Hudson Hoagland Society recognizes individuals who make yearly leadership gifts of \$1,000 or more to the Foundation's Annual Research Fund. Chaired by Penelope B. Rockwell, this society of individuals committed to assisting the Foundation with its biomedical research mission, added 23 new members in the last year, bringing total membership to nearly 200 from around the world.

In November, members of the Society attended a talk by John L. Sullivan, MD, renowned AIDS researcher and director of the UMMS Office for Research, discussing his hope that there will be an AIDS vaccine available within the next decade. Dr. Sullivan also reported on nevirapine drug trials taking place in South Africa that are helping curb the rate of AIDS transmissions from mothers to their babies.

Executive Committee Members

Penelope B. Rockwell, *Chair*
 Sarah G. Berry
 Tina Bilazarian
 Robert D. Blute Jr.
 Diane G. Dalton
 Warner S. Fletcher
 Elizabeth O. Frem
 Joseph B. Gill
 Laura Glazier
 Abraham W. Haddad
 Patricia A. Halpin
 Prentiss C. Higgins
 Maurice H. Martel
 Janet L. Montgomery
 Phyllis Pollack
 Robert Schultz
 Morton H. Sigel

On June 9, Peter Hillary, a member of one of the most famous adventuring families of the century, addressed the 14th annual meeting of the Hudson Hoagland Society. Hillary made international news in 1999 when he and two companions made the first-ever ascent of the Shackleton Glacier, establishing a new route to the South Pole.



Hudson Hoagland Society Chair
 Penelope Rockwell and Peter Hillary



Driving Research:

The Worcester Foundation Auxiliary



The Worcester Foundation Auxiliary continued its 52-year tradition in 1999 of building community support for the Worcester Foundation's missions of research and education. The group's primary fund-raising activity was the Wachusett Old Car Club's 25th Annual Antique Auto Show, held September 26 at Wachusett Mountain Ski Area in Princeton. Over 2,000 people attended this major event, helping to raise some \$10,000 to benefit the Auxiliary's Graduate Research Fellowship.



The auto show, chaired by Wayne and Bonnie Prescott, succeeded the Auxiliary's annual horse show, held for the past 27 years, and attracted entries from throughout the Northeast—over 250 autos representing 30 classes. Music, refreshments and sky rides up the mountain were also available during the sun-drenched day. The success of the auto show was due in large part to the support of the Crowley family, which owns Mt. Wachusett Ski Area; the late Frances Crowley was a long-time member and past president of the Auxiliary.

The funds raised were designated to support the fifth annual Worcester Foundation Auxiliary Graduate Fellowship. Diane Casey, a PhD candidate working in the laboratory of George B. Witman III, PhD, the George F. Booth Chair of Basic Sciences and UMMS professor of cell biology, has been awarded the fellowship for a second year. Casey is currently studying cell motility, or how cells move, a critical factor in reproduction and in diseases such as cancer.

Judy Langlois, 1999/2000 president of the Worcester Auxiliary, with Diane Casey, a PhD candidate who has been awarded the Auxiliary Graduate Fellowship for a second year.

1998/1999 Executive Board

Betsy Giles
President

Sally Holden
Vice President

Judy Langlois
Secretary

Susan McNamara
Corresponding Secretary

Marilyn Dillman
Treasurer

Florence Stowe
Assistant Treasurer

Bonnie Prescott
Nominating Committee Chair





Applauding Advocacy: Private Support for Research

Named Endowment Funds

The Worcester Foundation for Biomedical Research is grateful to the following donors and families who have established endowed positions or funds to provide ongoing support for research and education programs, ensuring the success of biomedical research programs. For information on establishing a named fund, please contact Mary Flynn Myers, Director of Major Gifts at (508) 856-1411.

Named Funds Providing Support for Endowed Positions

Vitold Arnett Endowed Professorship Fund

Established in 1998 through a generous gift from Vitold Arnett MD, PhD, to endow the Vitold Arnett Professorship in Cell Biology. Dr. Arnett established the fund to honor the memory of the Worcester Foundation's co-founder, Dr. Hudson Hoagland, in thanks for providing Dr. Arnett with early career direction.

Robert W. Booth Endowed Fund in Memory of George F. Booth

Established in 1992 as an endowment fund through a gift from Mr. Robert W. Booth's fund in memory of his father, George F. Booth, at the Greater Worcester Community Foundation to provide support for research. In 1998, the Booth Fund made an additional generous gift to establish the first endowed chair in basic research, the George F. Booth Chair of Basic Sciences.

David J. Freeland Memorial Endowment Fund

Established in 1987 in loving memory of their son David by I. Robert and Aviva Freeland, their family and friends. In 1998, this fund was combined with an additional generous gift from the Freelanders to the University of Massachusetts Medical School to create the David J. Freeland Memorial Professorship in AIDS Research.

H. Arthur Smith Endowed Chair Fund

Established in 1998 through a generous gift from the H. Arthur Smith Charitable Foundation to endow the H. Arthur Smith Chair for Cancer Research. Mr. Smith was a longtime, generous donor to cancer research at the Worcester Foundation during his lifetime.

Named Funds Providing Support for Graduate and Postdoctoral Education

Dr. Mark Steven Albion Fellowship Fund

Established in 1998 by Worcester Foundation Auxiliary member Ms. Leni Joyce to create a graduate fellowship in honor of her son Mark's birthday.

George I. Alden Education Fund

Established in 1991 through a major challenge grant from the George I. Alden Trust to attract new support for the Foundation's educational programs.

Anonymous Fund

Established in 1979 by a generous anonymous donor to benefit postdoctoral training and education.



Trustees of the H. Arthur Smith Charitable Foundation visited the University of Massachusetts Medical School and Worcester Foundation in the summer of 1999. Pictured left to right are: Richard B. Vallee, PhD, H. Arthur Smith Chair for Cancer Research; Smith Fellow Dmitry A. Samarsky, PhD; Smith Foundation Trustees Pamela A. Martin and Eugene C. Schofield; Attorney Matthew F. Erskine, chairman of the H. Arthur Smith Charitable Foundation; Smith Foundation Trustee Charles B. Campbell (since deceased); WFBF Director Thoru Pederson, PhD; Smith Foundation Trustee Janice E. Martin; and Smith Fellow Jian Yang, PhD.

***Charles B. and Abigail B. Knight
Memorial Fund***

Established in 1994 through a generous bequest by Mr. Kenneth H. Knight in memory of his grandparents, Charles and Abigail, in support of educational activities.

***Patricia M. O'Connell
Summer Student Fund***

Established in 1994 in loving memory of Mrs. Patricia M. O'Connell by her husband, Worcester Foundation scientist Dr. Robert O'Connell, friends and family to benefit the summer student education program.

Mark M. Weisberg Memorial Fund

Established in 1980 by the family of Mr. Mark M. Weisberg to benefit graduate or postdoctoral student research in cancer-related studies.

Grant Winthrop Fellowship Fund

Established in 1996 through a gift from the Joukowsky Family Foundation to honor Worcester Foundation Trustee Grant Winthrop and his steadfast commitment to research excellence. Income to benefit graduate or postdoctoral education.

***Named Funds Providing
Support for Research***

Chester Baylis Jr. Memorial Fund

Established in 1998 through a generous bequest from longtime Worcester Foundation trustee Mr. Chester Baylis to support promising basic biomedical research.

Barbara G. Brown Fund

Established in 1998 through a generous bequest from longtime Worcester Foundation friend Barbara Gifford Brown to support biomedical research.

***Fred Harris Daniels Fund in
Memory of F. Harold Daniels***

Created in 1992 through a generous endowment gift from the Fred Harris Daniels Foundation for the benefit of biomedical research.

***Warren A. and
Ruth H. Ellsworth Fund***

Established in 1989 by the trustees of the Ruth H. and Warren A. Ellsworth Foundation for the benefit of biomedical research.

***Elise and Monroe England Endowed
Fund for Biomedical Research***

Established in 1999 by generous friends Elise V. and Monroe B. England for the benefit of biomedical research, preferably in the field of diabetes.

Samuel Frank Fund

Established in 1993 by a generous bequest of Mr. Samuel Frank for the benefit of biomedical research.

General Endowment Fund

A permanent fund of the Worcester Foundation for general gifts to the endowment for the benefit of biomedical research and education.

Lydia Gifford Fund

Established in 1998 by a generous bequest from Lydia Gifford for the benefit of biomedical research.

***Mimi Aaron Greenberg
Cancer Research Institute***

Created in 1976 as a living memorial to Mimi Aaron Greenberg, widely admired and loved for her vibrant warmth and humanity. The Institute provides support for cancer research.

***Chester D. Heywood
Memorial Fund***

Established in 1979 by generous bequests from Rachel W. and Chester D. Heywood for the benefit of biomedical research.

Higgins Family Fund

Established in 1991 with a gift from members of the Higgins family for the benefit of biomedical research.

***Evelyn S. and Judith M. Isaacson
Memorial Biomedical Research Fund***

Created in 1983 by Mr. and Mrs. Joseph Isaacson in loving memory of their daughter Judith, and amended in 1992 to include Mrs. Evelyn Isaacson upon her passing, this fund benefits biomedical research.

Myles Morgan Memorial Fund

Established in 1979 by family, friends and business associates to honor the memory of Mr. Myles Morgan, incorporator and founding trustee of the Worcester Foundation, for the benefit of biomedical research.

***Joseph Persky
Biomedical Research Fund***

Established in 1980 to honor the memory of Mr. Joseph Persky, Worcester industrialist, philanthropist and longtime friend of the Worcester Foundation, for the benefit of biomedical research.

Martin M. Pollak Fund

Established in 1990 in honor of Worcester Foundation Trustee Mr. Martin M. Pollak for the benefit of biomedical research.

Harold R. and Helen G. Rafton Fund

Established in 1982 through the generous bequests of Mr. Harold R. Rafton and Mrs. Helen G. Rafton to provide support for general purposes.

***Morton and Vivian Sigel
Fund for Biomedical Research***

Established in 1998 by the Sigels' children in honor of their parents and to celebrate Board Chairman Mr. Morton H. Sigel's selection as the 1998 Hudson Hoagland Award recipient given in recognition of distinguished service to the Worcester Foundation.

Planned Gifts and Bequests

Helen W. Stoddard Fund

Established in 1999 through a generous bequest from Worcester philanthropist Mrs. Robert W. Stoddard. Mrs. Stoddard was a longtime friend of the Worcester Foundation and, at her direction, her fund supports biomedical research.

Worcester Foundation for Biomedical Research Scholars Fund

Established in 1999 by a vote of the Worcester Foundation Board of Trustees to consolidate three major, unrestricted endowment funds: the Einar W. and Gertrude Sundberg Fund (1988), the Anna P. Hoagland Memorial Fund (1971) and an endowed fund established by a generous anonymous donor (1993). The income from these funds will be awarded to promising, newly recruited scientists at the University of Massachusetts Medical School. Recipients hold the title of Worcester Foundation for Biomedical Research Scholars.

Wyman-Gordon Fund

Established in 1988 through a generous gift from the Wyman-Gordon Company for the benefit of biomedical research.

Named Funds Providing Support for Scientific Lectures

M. C. Chang Memorial Fund

Created in 1995 by family, friends and colleagues to honor Dr. M. C. Chang's pioneering contributions to the study of reproductive biology and early development. The income from this fund is used to sponsor M. C. Chang Distinguished Lectures in the field of reproductive biology.

Gregory Pincus Memorial Fund

Established in 1967 in memory of Dr. Gregory G. Pincus, renowned reproductive biologist and co-founder of the Worcester Foundation. The fund benefits the Gregory Pincus Memorial Lecture.

Each year, the Worcester Foundation receives a number of bequests from individuals who have demonstrated their commitment to the Worcester Foundation and biomedical research through a bequest intention, gift annuity, trust or other planned gift.

The Gregory Pincus Circle recognizes those individuals who have included the Worcester Foundation in their estate plans and is named to honor the memory of Worcester Foundation co-founder Dr. Gregory G. Pincus, who discovered the birth control pill. Members share what was Dr. Pincus' belief, that basic research offers the best hope for understanding and curing disease. Through their planned gifts, Pincus Circle members help to extend that spirit of hope to future generations by providing financial resources to fuel tomorrow's research breakthroughs.

The Pincus Circle invites inquiries from other friends of the Worcester Foundation who wish to make a planned gift in support of research.

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Gifts of all sizes are made to the Worcester Foundation through the Annual Research Fund, which includes a growing leadership donor club, the Hudson Hoagland Society. Each year, nearly a thousand donors contribute unrestricted support which is used to assist investigators at the University of Massachusetts Medical School as they pursue promising leads to uncover the causes of cancer, AIDS, Alzheimer's disease, Lou Gehrig's disease and other devastating illnesses. Unrestricted gifts also provide funds for the support and training of future scientists. The 1998-99 Annual Research Fund generated \$296,546 in unrestricted support from friends of the Worcester Foundation. We are grateful for their generosity and thank them for their continuing support.

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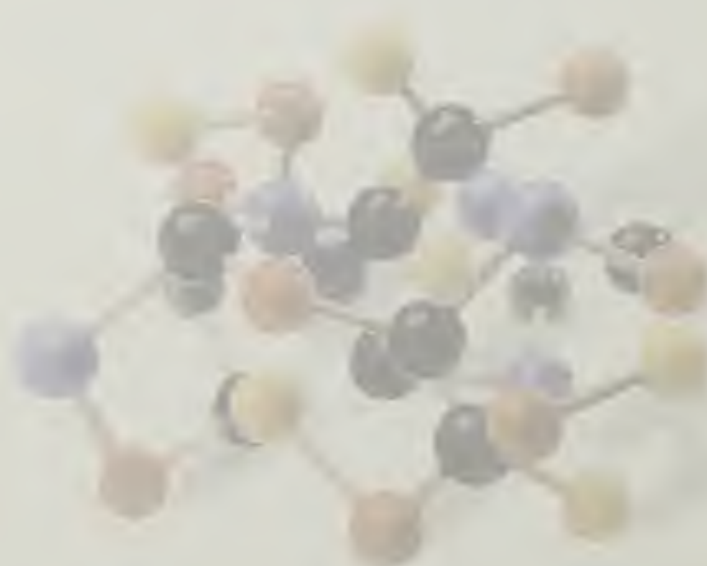
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